DEPARTMENT OF ENERGY
FY 2002 CONGRESSIONAL BUDGET REQUEST

FOSSIL ENERGY RESEARCH AND DEVELOPMENT

ADVANCED METALLURGICAL PROCESSES

## I. **Mission Supporting Goals and Objectives**:

The Advanced Metallurgical Processes program conducts inquiries, technological investigations, and research concerning the extraction, processing, use, and disposal of mineral substances under the mineral and materials science program at the Albany Research Center (ARC) in Oregon.

The program's goals are to address the full life cycle of materials production and cost-effective processing of improved materials through to their disposal and recycling. The program seeks to determine the factors that limit service life of materials in industrial, structural, or engineering applications and to provide solutions to service-life problems through new materials technology, to develop and demonstrate technologies that will reduce waste and pollution, and to use capabilities and expertise to provide focused solutions to high priority national problems. The research at ARC directly contributes to Fossil Energy's objectives by providing information on the performance characteristics of materials being specified for the current generation of power systems, on the development of cost-effective materials for inclusion in Vision 21 systems, and for solving environmental emission problems related to fossil fired energy systems. The program at ARC stresses full participation with industry through partnerships and emphasizes cost sharing to the fullest extent possible. All FY 2001 performance measures were met. FY 2002 performance measures include:

- Complete a summary report identifying mechanisms of degradation of coal gasification refractory materials. Initiate investigations on methods that might be used to monitor the corrosion of refractories during slag attack testing and possible use of these techniques in industrial applications.
- Construct and operate a continuous bench scale reactor, 5 lbs. an hour, to demonstrate the mineral carbonation process.

II. A. **Funding Schedule**: ADVANCED METALLURGICAL PROCESSES (Cont'd)

| Activity | FY 2000 | FY 2001 | FY 2002 | $Change | %Change |
|---|---|---|---|---|---|
| Advanced Metallurgical Processes | $5,000 | $5,214 | $5,200 | $-14 | 0% |
| Total, Advanced Metallurgical Processes | $5,000 | $5,214 | $5,200 | $-14 | 0% |

II. B. **Laboratory and Facility Funding Schedule**

| | FY 2000 | FY 2001 | FY 2002 | $Change | %Change |
|---|---|---|---|---|---|
| All Other | $5,000 | $5,214 | $5,200 | $-14 | 0% |
| Total, Advanced Metallurgical Processes | $5,000 | $5,214 | $5,200 | $-14 | 0% |

III. **Performance Summary**:

| Activity | FY 2000 | FY 2001 | FY 2002 |
|---|---|---|---|
| Advanced Metallurgical Processes | Continue research identified during FY 1999 to contribute to Fossil Energy's Vision 21 Systems to include reducing greenhouse gas emissions through $CO_2$ sequestration, advanced refractory research, and partnerships for implementing improved efficiency technology, energy production system by-product processing and materials development. Continue research efforts in partnership with industry and with State and Federal agencies to build viable domestic | Continue research identified during FY 2000 to contribute to Fossil Energy's Vision 21 Systems to include reducing greenhouse gas emissions through $CO_2$ sequestration, and advanced refractory research. Continue research efforts by developing partnerships with industry and with State and Federal agencies to build viable domestic commercial capabilities in waste-free environmentally benign materials production, energy production | Continue research to contribute to Fossil Energy's Vision 21 Systems to include reducing greenhouse gas emissions through $CO_2$ sequestration, and advanced refractory research. Continue research efforts by developing partnerships with industry and with State and Federal agencies to build viable domestic commercial capabilities in waste-free environmentally benign materials production, energy production system by-product processing and |

III. **Performance Summary**: ADVANCED METALLURGICAL PROCESSES (Cont'd)

| Activity | FY 2000 | FY 2001 | FY 2002 |
|---|---|---|---|
| Advanced Metallurgical Processes (Cont'd) | commercial capabilities in waste-free environmentally benign materials production. Continue research efforts to achieve better understanding of wear, corrosion, and fracture, resulting in an improved understanding of component structure and properties for better performance in mining and processing of coal and in Vision 21 System components. Develop a continuous casting process for lightweight titanium for gas and oil industry applications. ($4,950) (ARC) | system by-product processing and materials development. Continue research efforts to achieve better understanding of wear, corrosion, and fracture, resulting in an improved understanding of component structure and properties for better performance in Vision 21 System components, in powerplant infrastructure, and in mining and minerals processing equipment. ($5,162) (ARC) | materials development. Continue research efforts to achieve better understanding of wear, corrosion, and fracture, resulting in an improved understanding of component structure and properties for better performance in Vision 21 System components, in powerplant infrastructure, and in mining and minerals processing equipment. ($5,148) (ARC) |
| | Fund technical and program management support. ($50) | Fund technical and program management support. ($52) | Fund technical and program management support. ($52) |
| Advanced Metallurgical Processes, Total | $5,000 | $5,214 | $5,200 |